Basin-Specific Feasibility Studies
Everglades Protection Area Tributary Basins

Task 3 Summary Report

Submitted to
South Florida Water Management District

February 5, 2002

Contract No. C-E024

Project No. 21853

BROWN AND CALDWELL

Introduction

Brown and Caldwell (BC) and members of our subconsultant team have reviewed the South Florida Water Management District's (District) preliminary alternative combinations of water quality solutions for the following Everglades Protection Area basins: C-11W, North New River Canal, North Springs Improvement District, Feeder Canal, L-28, and Wellington/ACME Basin B. The work was performed under Task 3 of Contract C-E024, Basin-Specific Feasibility Studies for the Everglades Stormwater Program (ESP) Basins. The information contained in this report is based on comments originally submitted to the District in a series of peer review letters dated November 30, 2001, December 12, 2001, and January 17, 2002. Copies of these letters are provided in Appendix A. Appendix B contains two letters from the District, dated December 21, 2001 and January 31, 2002, responding to the BC Team's peer review comments.

C-11 West Basin

The following are the BC Team's comments and suggestions on the preliminary set of alternative water quality solutions proposed by the District for the C-11 West Basin.

Alternative 1

It is not clear what type of chemical treatment facility is being proposed in Alternative 1. The CTSS technology developed in the STSOC process employs flow equalization to reduce the size of the CTSS process units required. From the description of the chemical treatment component of this alternative, it does not sound like flow equalization is envisioned. This would tend to drive up the cost of the chemical treatment facility. We suggest clarification on this point or rewording of the description of the chemical treatment component in this alternative.

It does not seem reasonable to assume that a chemical treatment facility would continue in operation after June 2036 to treat 1 percent of the stormwater runoff from the C-11 West Basin. The 1 percent of the baseline flow to be treated most likely would not be evenly distributed throughout the year, suggesting that the treatment facilities would be idle for a majority of the time or would need to be kept in a standby condition. This might be possible with a chemical treatment facility, but not with an STA. Even if it is possible, there is no basis for estimating the cost of maintaining the treatment facilities in a standby mode or for projecting their treatment performance in such an operational mode. We suggest that the District consider eliminating the chemical treatment component of Alternative 1 after June 2036 and making all three alternatives for the C-11 West Basin the same for the period 2036 through 2055 (source controls and CERP only).

Alternative 2

In Alternative 2, the STA component is described as "…consisting generally of 25% emergent vegetation, 50% submerged aquatic vegetation (SAV) and 25% periphyton STA (PSTA)". Is there any data to support the applicability of this combination of biological treatment technologies for this basin? Given the low inflow P concentration in stormwater runoff from the C-11 West Basin (22 ppb), we question that an STA cell dominated by emergent vegetation would provide effective treatment. We believe an aquatic system dominated by SAV and/or periphyton would be more likely to reduce P concentrations.

> **NOTE:** The District, in a response letter to BC dated December 21, 2001, asked, "Is it the best professional judgement of the Brown and Caldwell team that there should be no emergent vegetation in the front end of a biological treatment system for this basin?"
>
> It is *not* the professional judgement of the Brown and Caldwell team at this time that there should be no emergent vegetation in the front end of a biological treatment system for this basin. We have not studied

the hydraulics of an STA in the C-11 West Basin and, currently, there is no any guidance on the optimum partitioning of vegetation communities within an STA. It is our plan, as part of Task 4, to determine an optimal combination of biological technologies (emergent vegetation, SAV and periphyton-based communities) for the STA in the C-11 West Basin using DMSTA to realize the maximum P removal with the least amount of land. We understand that the final version of DMSTA, which will allow us to make this determination, will not be available from the District until sometime in March 2002.

As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the C-11 West Basin using the District's proposed 25/50/25 combination of biological treatment technologies. The results of the modeling show that it is possible to achieve a 10 ppb effluent P concentration even though none of the research studies to date have been able to consistently achieve this result. In our mind, this points out how important it is that the District establish a set of rules and procedures for how the DMSTA model is to be used (calibration data sets, etc.) in evaluating biological treatment alternatives in the Basin Specific Feasibility Studies. We believe that when these rules and procedures are established, the DMSTA model will become a valuable tool for determining the most effective combination of biological treatment technologies in each basin as well as for projecting P removal performance and land area requirements.

It does not seem reasonable to assume that an STA would continue in operation after June 2036 to treat 1 percent of the stormwater runoff from the C-11 West Basin. The 1 percent of the baseline flow to be treated most likely would not be evenly distributed throughout the year, suggesting that the treatment facilities would be idle for a majority of the time or would need to be kept in a standby condition. This might be possible with a chemical treatment facility, but not with an STA. Even if it is possible, there is no basis for estimating the cost of maintaining the treatment facilities in a standby mode or for projecting their treatment performance in such an operational mode. We suggest that the District consider eliminating the STA component of Alternative 2 after June 2036 and making all three alternatives for the C-11 West Basin the same for the period 2036 through 2055 (source controls and CERP only).

We believe that, in some cases, significant cost savings may be realized if projects required to meet the water quality goals of the Everglades Forever Act (EFA) are combined with projects designed to meet the water quantity and distribution objectives of CERP. An example is the CERP reservoir proposed for the C-11 West Basin. If an STA was constructed in the short-term (December 2005) in the location where the CERP reservoir is to be constructed in the longer term (2018), and the STA was designed to be compatible with reservoir operation, it is possible that significant cost savings could result. At a minimum, less land would need to be acquired. Some ancillary long-term treatment benefits might also result. Potential cost savings are associated with this approach and we suggest that the District consider a fourth alternative in the C-11 West Basin that would allow these cost savings to be defined.

Alternative 3

We do not have any suggestions or recommendations for changes to Alternative 3.

North New River Canal Basin

We do not have any suggestions or recommendations for changes to the preliminary alternatives proposed for the North New River Canal Basin. We believe that the three alternatives proposed by the District adequately cover the range of potential water quality solutions available.

North Springs Improvement District Basin

The following are the BC Team's comments and suggestions on the preliminary set of alternative water quality solutions proposed by the District for the North Springs Improvement District (NSID) Basin.

Alternative 1

Alternative 1 calls for a chemical treatment facility to be constructed by 2006 and operated for one year until diversion of runoff from this basin can be diverted to the Hillsboro Impoundment in 2007. We do not believe this is a realistic alternative unless there are other potential water quality benefits to be realized from continued operation of the treatment facility. There are other less costly approaches to chemical treatment that could possibly be implemented on a short-term temporary basis (e.g. use of existing rock pits north of the NSID Basin). We would be glad to discuss these approaches with the District if there is any interest. However, we would recommend that the temporary (i.e. one year) chemical treatment alternative be eliminated altogether.

Alternatives 2 and 3

Another potential alternative for this basin would be to combine the diversion options in Alternatives 2 and 3. It may be possible that a temporary diversion for one year could be achieved in conjunction with planned conversion of agricultural land in the NSID Basin to urban land use between now and 2006. This would need to be coordinated with the developer(s) involved, but if it could be implemented, it would likely be much less costly than constructing a chemical treatment facility that would operate for only one year.

Feeder Canal Basin

Additional information on the alternatives in this basin was gained from a presentation by District staff at a workshop with project stakeholders at the District's Clewiston Field Station on December 11, 2001. The following are the BC Team's comments and suggestions on the preliminary set of alternative water quality solutions proposed by the District for the Feeder Canal Basin.

General Comment

Because of the potentially larger contribution from Best Management Practices (BMPs) in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

Alternative 1

The flow diversion component in Alternative 1 is not detailed in the alternatives document. However, from the presentation at the workshop, it is our understanding that the District's intent for the flow diversion component is to construct stormwater retention areas to equalize peak flows and allow water to sheet flow from the L-28 Interceptor Canal south and west into the Big Cypress National Preserve. In all likelihood this, will require degradation of at least some of the levee on the west side of the L-28 Interceptor Canal. This is the same concept proposed for the Big Cypress/L-28 Interceptor Modifications Project to be constructed as part of CERP by June 2015. By constructing this component as part of the improvements needed to meet EFA requirements, the District would be achieving integration with CERP and could potentially realize considerable cost savings as a result. However, showing both the flow diversion component and the CERP component in Alternative 1 is probably redundant. If our understanding of the District's flow diversion component is correct, the only difference between Alternatives 1 and 3 is the timing of the diversion and the source of funding to pay for it.

The description of the flow diversion component of Alternative 1 states that … *"It is assumed that the diversion of flow to the Big Cypress National Preserve will achieve a 100% reduction in flows to the S-190 and therefore total loads of phosphorus to WCA."* This assumption would seem to conflict with the concept of converting the S-190 into a pumping station and pushing water into the L-28 Interceptor Canal for diversion into the Big Cypress National Preserve as proposed in the CERP project for this basin. It would also seem to conflict with the information presented by District staff at the December 11 workshop regarding the concept for the flow diversion component of Alternative 1. Some clarification on this issue would be helpful.

Stakeholders familiar with Big Cypress National Preserve indicated that sheet flow of 100% of the L-28 basin flows into the Big Cypress National Preserve may not be possible due to topographic limitations.

Alternative 2

The STA component of Alternative 2 does not indicate what type of natural treatment technology may be most appropriate for this basin. As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the Feeder Canal Basin using emergent STA, SAV and PSTA treatment technologies. While preliminary, the results of the modeling showed that the SAV technology was able to achieve low effluent P concentrations using less land than either of the other two technologies individually. However, it is likely that the STA component of Alternative 2 will involve some combination of these technologies to realize the maximum P removal with the least amount of land being required. The STA component of Alternative 2 should probably reflect this.

Alternative 3

We do not have any suggestions or recommendations for changes to Alternative 3.

L-28 Basin

Additional information on the alternatives in this basin was gained from a presentation by District staff at a workshop with project stakeholders at the District's Clewiston Field Station on December 11, 2001. The following are the BC Team's comments and suggestions on the preliminary set of alternative water quality solutions proposed by the District for the L-28 Basin.

General Comments

Because of the potentially larger contribution from BMPs in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

The Introduction of the Alternatives document states that the Miccosukee Water Management Plan (MWMA) will be completed in 2010. In the Alternatives summary on page 6, as well as throughout the Alternative descriptions, the MWMA is described as being completed in 2015.

Alternative 1

The description of Alternative 1 does not provide any explanation of what flows will be treated by the STA component. Given the Critical Project component related to the Seminole Reservation Water Conservation Plan and the CERP component involving an STA on the Miccosukee Reservation, it is not clear what flows will remain and how those flows can be collected and routed to a STA without extensive infrastructure improvements. While the concept of treating runoff from the L-28 Basin using natural treatment technology is sound, arriving at a plan for its implementation may be difficult and costly. We would propose that the District look into the possibility of integrating the STA component of Alternative 1 with elements of the projects proposed for the Seminole and/or Miccosukee Reservations to simplify the improvements required.

Alternative 2

We do not have any suggestions or recommendations for changes to Alternative 2.

Wellington / ACME Basin B

Two of the alternatives proposed for ACME Basin B were described in the District document entitled *"Preliminary Alternative Combinations for Wellington/ACME Basin B*, Final Draft, dated December 20, 2001. A third alternative was identified during a presentation of the preliminary alternatives by District staff and the Village of Wellington's Surface Water Action Team (SWAT) at a workshop at the District's offices in West Palm Beach on January 7, 2002. The following are the BC Team's comments and suggestions on the preliminary set of alternative water quality solutions proposed by the District for the ACME Basin B.

Alternative 1

Alternative 1 involves implementation of source controls and the diversion of ACME Basin B runoff south to the Agricultural Reserve Reservoir to be constructed in August 2013 along the east side of the Loxahatchee National Wildlife Refuge (Refuge) as part of CERP. Prior to 2013, runoff from ACME Basin B would continue to be discharged to the Refuge, as is currently the practice.

As originally proposed, this alternative would have directed flow from ACME Basin B south into the Lake Worth Drainage District (LWDD) system for conveyance to the Agricultural Reserve Reservoir. However, the LWDD has since taken the position that they do not have capacity in their system for the additional water and do not want to accept any runoff from ACME Basin B. Accordingly, Alternative 1 has been modified to include a new canal, beginning at the southeast corner of Section 34 in Basin B and running south along the east side of the Strazzula property directly to the Agricultural Reserve Reservoir.

It is our understanding that the modified alternative will likely require the new canal to pass under at least one LWDD canal to avoid mixing of waters from the two drainage systems. If required, this will increase the cost of the ACME Basin B diversion project.

This alternative has the advantage of not requiring any treatment of stormwater runoff because the water would be diverted away from the Everglades Protection Area (EPA) for other beneficial purposes. Conversely, this alternative also results in the discharge of water to the EPA until 2013 that very likely will not meet water quality standards.

Alternative 2

Alternative 2 includes implementation of basin-scale source controls, as in Alternative 1, and continued discharge to the EPA. Chemical treatment would be used to reduce phosphorus (P) concentrations in the stormwater runoff to levels that meet water quality standards prior to it being pumped into the Refuge. In 2000/2001, HSA Environmental Engineers, Inc. (HSA) completed a pilot scale investigation of chemical treatment of stormwater runoff from ACME Basin B. That investigation showed that it is possible to reduce the P concentration in runoff from Basin B to 10 ppb or less using conventional chemical addition, flocculation, settling, and filtration processes. Additionally, none of the treated effluent streams showed any toxicity effects and none of the residual sidestreams (sludges, etc.) were found to be hazardous. This work demonstrates that, based upon the research completed to date, chemical treatment of stormwater runoff from ACME Basin B to meet water quality standards is technically feasible.

As proposed, Alternative 2 would include construction of a multi-purpose reservoir in Section 24, west of Basin B, for flood control, water supply and water quality treatment. Water from the reservoir would be treated in a chemical treatment facility, assumed to be similar in process configuration to that developed by HSA for the pilot scale investigations. The multi-purpose reservoir in Section 24 would serve to equalize flow

through the treatment facility. Chemically treated water would be discharged into a linear, shallow retention area to be constructed between the existing C-27 canal and L-40 levee, before being pumped into the Refuge through existing Pump #1, Pump #2 or both. This results in highly treated water, but water that has a limited amount of natural "conditioning" prior to being discharged into the EPA. Since the chemical treatment process can achieve less than 10 ppb of total phosphorus, untreated stormwater could be blended with the treated effluent to achieve a 10 ppb effluent, thus producing a combined effluent of treated and naturally conditioned waters.

An alternate approach might be to construct the project with the reservoir in Section 24 being used only for flood control and water supply purposes, thereby maximizing its value for flow equalization upstream of the chemical treatment facility. After chemical treatment, the water would flow though the linear retention area as before, but would then pass through a wetland system before being discharged into the Refuge. The size and type of wetland system to be used for effluent conditioning would need to be determined as part of the alternatives evaluation. Some insight in this regard may be gained from recent data from research in North Test Cell 14 which suggests that the increase in effluent P concentration from a conditioning wetland system such as SAV and PSTA may be reduced significantly after only several months. This alternate approach would involve additional infrastructure and additional cost, but could result in very high quality water which includes a natural buffering system between the chemical treatment facility and the EPA.

Alternative 3

Alternative 3 was identified in the January 7, 2002 District workshop. In this alternative, a stormwater treatment area (STA) would be constructed in Section 24 instead of the multi-purpose reservoir proposed in Alternative 2. The STA would be designed and operated to obtain maximum treatment with flood control and water supply being secondary objectives. Water discharged from the STA would flow through a linear retention area between the C-27 canal and the L-40 before being pumped into the Refuge using existing Pump #1, Pump #2, or both.

As part of our review of this alternative, Brown and Caldwell team members ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from ACME Basin B. The following assumptions were made in performing the DMSTA model runs:

1. A land area of 410 acres was assumed to be available for an STA (Section 24).

   NOTE: The BC Team has subsequently been instructed by the District to use a land area of 375 acres during Task 4 alternative evaluations.

2. The flow-weighted mean inflow P concentration to the STA is 94 ppb.

3. A composite STA, consisting of 40 percent emergent macrophytes followed by 60 percent submerged aquatic vegetation (SAV), was assumed for the analysis. This composition of wetland vegetation was discussed and verbally accepted for preliminary evaluation purposes by District staff at the STA Design Group Meeting on January 8, 2002. This preliminary composition will be reassessed during the alternatives evaluation once the final calibration of the DMSTA model is available.

4. The model parameters used to simulate emergent vegetation cells and SAV cells are those from ENR Cell 2 and ENR Cell 4, respectively. These model parameters are taken from a draft version of DMSTA dated January 23, 2001. A final version of DMSTA is expected to be available for use in the Basin Specific Feasibility Studies in March 2002.

5. Source controls (BMPs, ordinances, etc.) were assumed to reduce the flow-weighted mean inflow P concentration to the STA by 0%, 10%, 20%, 30%, 40% and 50%.

Table 1 presents the results of the preliminary DMSTA simulations for Alternative 3. Using a 410-acre STA, and the other assumptions as identified above, it is possible to reduce flow weighted mean P concentrations from 94 ppb to 32 ppb without source controls and to 21 ppb if 50% of the P load is removed by source controls prior to treatment. This equates to geometric means of 20 ppb and 14 ppb, respectively.

TABLE 1

DMSTA Predictions for Various Levels of Source Reduction for the ACME B Basin

STA Area * (ac)	Inflow Reduction (%)	Flow-Weighted P Inflow (ppb)	Flow-weighted P Outflow (ppb)	Geometric Mean P Outflow (ppb)
410	0	94.2	31.9	20.3
410	10	84.6	29.8	19.1
410	20	75.2	27.6	17.9
410	30	65.8	25.4	16.7
410	40	56.4	23.2	15.4
410	50	47.0	20.9	14.2

Notes:

Based on 3 cells in series with 40% Emergent / 60% SAV

Tanks-in-Series: Emergent - 3 TIS, SAV - 3 TIS

Calibration Data: EMA - ENR Cell 2, SAV - ENR Cell 4

ACME B Mean flow 31,500 ac-ft/yr

*** The BC Team has subsequently been instructed by the District to use a land area of 375 acres during Task 4 alternative evaluations.**

As an additional preliminary analysis, BC used the DMSTA model to evaluate the amount of land required for a STA with 50% source control to reach a flow weighted mean outflow P concentration of 15 ppb. We chose this P concentration as a target because (1) it generally equates to a geometric mean outflow concentration of 10 ppb, the planning level target for the Basin Specific Feasibility Studies, and (2) it generally represents the lower limit of P concentration currently achievable with biological technologies. Ongoing research sponsored by the SFWMD is anticipated to provide further data regarding the P concentration limits that can ultimately be achieved using biological technologies. However, based on this preliminary analysis, it is estimated that approximately 1200 acres of STA will be required to achieve a flow weighted mean outflow P concentration of 15 ppb (10 ppb geometric mean) if 50% of the P is removed through source controls beforehand. This analysis will be updated and refined during the actual Task 4 alternatives evaluation using the final version of the DMSTA model that will be available in March 2002.

Summary

The BC Team has peer reviewed the District's preliminary sets of alternative combinations of water quality solutions in the six ESP basins discharging to the EPA. Where appropriate, we have made suggestions and recommendations for refinement to the alternatives and, in two cases, have recommended that additional alternatives also be considered. Overall, we believe the alternatives proposed by the District adequately cover the range of water quality solutions reasonably available in each basin. However, the alternatives remain conceptual and considerable work remains to define their components in sufficient detail to allow for proper evaluation. That will be a component of the next phase of work in Task 4 of the Basin Specific Feasibility Studies.

References

HSA Engineers & Scientists, Milian, Swain, & Associates, and Lockhart AG Technologies. *Chemical Treatment Followed by Solids Separation Advanced Technology Demonstration Project.*

South Florida Water Management District. *Preliminary Alternative Combinations for the ESP Basins.* November 7, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for the C11-West Basin.* November 7, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for the North New River Canal Basin.* November 7, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for the North Springs Improvement District Basin.* November 7, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for the Feeder Canal Basin.* November 21, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for the L-28 Basin.* November 21, 2001.

South Florida Water Management District. *Preliminary Alternative Combinations for Wellington/ACME Basin B.* December 20, 2001

BROWN AND CALDWELL

Appendix A - Brown and Caldwell Peer Review Comment Letters to South Florida Water Management District

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November 30, 2001

BROWN AND CALDWELL
Environmental Engineering & Consulting

Ms. Tracey T. Piccone, P.E.
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33416

60/21853-02

Subject: Basin Specific Feasibility Studies -
Peer Review of Preliminary Alternatives for the
C-11 West, NNRC and NSID Basins

Dear Ms. Piccone:

Brown and Caldwell and members of our subconsultant team have reviewed the District's preliminary alternative combinations of water quality solutions for the C-11 West Basin, the North New River Canal Basin and the North Springs Improvement District (NSID) Basin. Overall, we find the District's set of alternatives in each basin to be good for the purpose of evaluating different approaches to meeting water quality goals. However, we have several comments and suggestions for the District to consider before finalizing the alternatives. These include the following:

C-11 West Basin

1. It is not clear what type of chemical treatment facility is being proposed in Alternative 1. The CTSS technology developed in the STSOC process employs flow equalization to reduce the size of the CTSS process units required. From the description of the chemical treatment component of this alternative, it does not sound like flow equalization is envisioned. This would tend to drive up the cost of the chemical treatment facility. We suggest clarification on this point or rewording of the description of the chemical treatment component in this alternative.

2. In Alternative 2, the STA component is described as "…consisting generally of 25% emergent vegetation, 50% submerged aquatic vegetation (SAV) and 25% periphyton STA (PSTA)". Is there any data to support the applicability of this combination of biological treatment technologies for this basin? Given the low inflow P concentration in stormwater runoff from the C-11 West Basin (22 ppb), we question that an STA cell dominated by emergent vegetation would

provide effective treatment. We believe an aquatic system dominated by SAV and/or periphyton would be more likely to reduce P concentrations.

As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the C-11 West Basin using the District's proposed 25/50/25 combination of biological treatment technologies. The results of the modeling show that it is possible to achieve a 10 ppb effluent P concentration even though none of the research studies to date have been able to consistently achieve this result. In our mind, this points out how important it is that the District establish a set of rules and procedures for how the DMSTA model is to be used (calibration data sets, etc.) in evaluating biological treatment alternatives in the Basin Specific Feasibility Studies. We believe that when these rules and procedures are established, the DMSTA model will become a valuable tool for determining the most effective combination of biological treatment technologies in each basin as well as for projecting P removal performance and land area requirements.

3. It does not seem reasonable to assume that a chemical treatment facility or an STA would continue in operation after June 2036 to treat 1 percent of the stormwater runoff from the C-11 West Basin. The 1 percent of the baseline flow to be treated most likely would not be evenly distributed throughout the year, suggesting that the treatment facilities would be idle for a majority of the time or would need to be kept in a standby condition. This might be possible with a chemical treatment facility, but not with an STA. Even if it is possible, there is no basis for estimating the cost of maintaining the treatment facilities in a standby mode or for projecting their treatment performance in such an operational mode. We suggest that the District consider eliminating the chemical treatment component of Alternative 1 and the STA component of Alternative 2 after June 2036 and making all three alternatives for the C-11 West Basin the same for the period 2036 through 2055 (source controls and CERP only).

4. We believe that, in some cases, significant cost savings may be realized if projects required to meet the water quality goals of the Everglades Forever Act (EFA) are combined with projects designed to meet the water quantity and distribution objectives of CERP. An example is the CERP reservoir proposed for the C-11 West Basin. If an STA was constructed in the short-term (December 2005) in the location where the CERP reservoir is to be constructed in the longer term (2018), and the STA was designed to be compatible with reservoir operation, it is possible that significant cost savings could result. At a minimum, less land would need to be acquired. Some ancillary long-term treatment benefits might also result. Potential cost savings are associated with this approach and we suggest that the District consider a

fourth alternative in the C-11 West Basin that would allow these cost savings to be defined.

North New River Canal Basin

We do not have any recommendations for changes to the preliminary alternatives proposed for this basin. We believe that the three alternatives proposed adequately cover the range of water quality solutions available.

North Springs Improvement District Basin

Alternative 1 calls for a chemical treatment facility to be constructed by 2006 and operated for one year until diversion of runoff from this basin can be diverted to the Hillsboro Impoundment in 2007. We do not believe this is a realistic alternative unless there are other potential water quality benefits to be realized from continued operation of the treatment facility. There are other less costly approaches to chemical treatment that could possibly be implemented on a short-term temporary basis (e.g. use of existing rock pits north of the NSID Basin). We would be glad to discuss these approaches with the District if there is any interest. However, we would recommend that the temporary (i.e. one year) chemical treatment alternative be eliminated altogether.

Another potential alternative for this basin would be to combine the diversion options in Alternatives 2 and 3. It may be possible that a temporary diversion for one year could be achieved in conjunction with planned conversion of agricultural land in the NSID Basin to urban land use between now and 2006. This would need to be coordinated with the developer(s) involved, but if it could be implemented, it would likely be much less costly than constructing a chemical treatment facility that would operate for only one year.

Summary

We hope these comments will be of benefit to the District in finalizing the alternatives to be evaluated by the Brown and Caldwell team in the Basin Specific Feasibility Studies. We will be glad to meet with you and other District Staff at your convenience to discuss them. In the meantime, if you have any questions, please do not hesitate to contact me

Very truly yours,

BROWN AND CALDWELL

James A. Nissen, P.E., DEE
Senior Project Manager

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December 12, 2001

BROWN AND CALDWELL
Environmental Engineering & Consulting

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South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33416 60/21853

Subject: C-E024, Basin Specific Feasibility Studies
Peer Review of Preliminary Alternatives for the Feeder Canal and L-28 Basins

Dear Ms. Piccone:

Brown and Caldwell and members of our subconsultant team have reviewed the South Florida Water Management District's (District) preliminary alternative combinations of water quality solutions for the Feeder Canal Basin and the L-28 Basin. These alternatives were described in two District documents entitled *"Preliminary Alternative Combinations for the Feeder Canal Basin"* and *"Preliminary Alternative Combinations for the L-28 Basin"*, both dated November 21, 2001. Additional information was gained from presentations of the preliminary alternatives by District staff at a workshop with project stakeholders at the District's Clewiston Field Station on December 11, 2001. The District's preliminary alternatives in these two basins are very conceptual because prior work in these basins has been less extensive than in the Everglades Agricultural Area (EAA) basins to the east. However, we have several comments and suggestions for the District to consider before finalizing the alternatives. These include the following:

<u>Feeder Canal Basin</u>

1. Because of the potentially larger contribution from Best Management Practices (BMPs) in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

2. The flow diversion component in Alternative 1 is not detailed in the alternatives document. However, from the presentation at the workshop, it is our understanding that the District's intent for the flow diversion component is to construct stormwater retention areas to equalize peak flows and allow water to sheet flow from the L-28 Interceptor Canal south and west into the Big Cypress National Preserve. In all likelihood this, will require degradation of at least some of the levee on the west side of the L-28 Interceptor Canal. This is the same concept proposed for the Big Cypress/L-28 Interceptor Modifications Project to be constructed as part of the Comprehensive Everglades Restoration Plan

(CERP) by June 2015. By constructing this component as part of the improvements needed to meet Everglades Forever Act requirements, the District would be achieving integration with CERP and could potentially realize considerable cost savings as a result. However, showing both the flow diversion component and the CERP component in Alternative 1 is probably redundant. If our understanding of the District's flow diversion component is correct, the only difference between Alternatives 1 and 3 is the timing of the diversion and the source of funding to pay for it.

3. The description of the flow diversion component of Alternative 1 states that … *"It is assumed that the diversion of flow to the Big Cypress National Preserve will achieve a 100% reduction in flows to the S-190 and therefore total loads of phosphorus to WC3A."* This assumption would seem to conflict with the concept of converting the S-190 into a pumping station and pushing water into the L-28 Interceptor Canal for diversion into the Big Cypress National Preserve as proposed in the CERP project for this basin. It would also seem to conflict with the information presented by District staff at the December 11 workshop regarding the concept for the flow diversion component of Alternative 1. Some clarification on this issue would be helpful.

4. Stakeholders familiar with Big Cypress National Preserve indicated that sheet flow of 100% of the L-28 basin flows into the Preserve may not be possible due to topographic limitations.

5. The STA component of Alternative 2 does not indicate what type of natural treatment technology may be most appropriate for this basin. As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the Feeder Canal Basin using emergent STA, SAV and PSTA treatment technologies. While preliminary, the results of the modeling showed that the SAV technology was able to achieve low effluent P concentrations using less land than either of the other two technologies individually. However, it is likely that the STA component of Alternative 2 will involve some combination of these technologies to realize the maximum P removal with the least amount of land being required. The STA component of Alternative 2 should probably reflect this.

<u>L-28 Basin</u>

1. Because of the potentially larger contribution from BMPs in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

2. The description of Alternative 1 does not provide any explanation of what flows will be treated by the STA component. Given the Critical Project component related to the Seminole Reservation Water Conservation Plan and the CERP

component involving an STA on the Miccosukee Reservation, it is not clear what flows will remain and how those flows can be collected and routed to a STA without extensive infrastructure improvements. While the concept of treating runoff from the L-28 Basin using natural treatment technology is sound, arriving at a plan for its implementation may be difficult and costly. We would propose that the District look into the possibility of integrating the STA component of Alternative 1 with elements of the projects proposed for the Seminole and/or Miccosukee Reservations to simplify the improvements required.

3. The Introduction states that the Miccosukee Water Management Plan (MWMA) will be completed in 2010. In the Alternative summary on page 6 as well as throughout the Alternative detail descriptions, the MWMA is described as being completed in 2015.

Summary

We hope these comments will be of benefit to the District in finalizing the alternatives to be evaluated by the Brown and Caldwell team in the Basin Specific Feasibility Studies. We will be glad to meet with you and other District staff at your convenience to discuss them. In the meantime, if you have any questions, please do not hesitate to contact me.

Sincerely,

BROWN AND CALDWELL

James A. Nissen, P.E., DEE
Senior Project Manager

JN:jn

Cc: Angela Berry, Brown and Caldwell
Arsenio Milian, Milian Swain & Associates, Inc.
Tom Emenhiser, HSA Engineers & Scientists, Inc.
Earl Shannon, HSA Engineers & Scientists, Inc.
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BROWN AND CALDWELL

Environmental Engineering & Consulting

January 17, 2002

Ms. Tracey T. Piccone, P.E.
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33416

60/21853.300.03

Subject: Basin Specific Feasibility Studies -
Peer Review of Preliminary Alternatives for
Wellington/ACME Basin B

Dear Ms. Piccone:

Brown and Caldwell and members of our subconsultant team have reviewed three of the District's preliminary alternative combinations of water quality solutions for ACME Basin B. Two of these alternatives were described in the District document entitled *"Preliminary Alternative Combinations for Wellington/ACME Basin B*, Final Draft, dated December 20, 2001. A third alternative was identified during presentation of the preliminary alternatives by District staff and the Village of Wellington's Surface Water Action Team (SWAT) at a workshop at the District's offices in West Palm Beach on January 7, 2002. The following summarize our comments on the three preliminary alternatives reviewed by the Brown and Caldwell team.

Alternative 1

Alternative 1 involves implementation of source controls and the diversion of ACME Basin B runoff south to the Agricultural Reserve Reservoir to be constructed in August 2013 along the east side of the Loxahatchee National Wildlife Refuge (Refuge) as part of CERP. Prior to 2013, runoff from ACME Basin B would continue to be discharged to the Refuge, as is currently the practice.

As originally proposed, this alternative would have directed flow from ACME Basin B south into the Lake Worth Drainage District (LWDD) system for conveyance to the Agricultural Reserve Reservoir. However, the LWDD has since taken the position that they do not have capacity in their system for the additional water and do not want to accept any runoff from ACME Basin B. Accordingly, Alternative 1 has been modified to include a new canal, beginning at the southeast corner of Section 34 in Basin B and running south along the east side of the Strazzula property directly to the Agricultural Reserve Reservoir.

It is our understanding that the modified alternative will require the new canal to pass under at least one LWDD canal to avoid mixing of waters from the two drainage systems. While this will increase the cost of the ACME Basin B diversion project, it should be technically feasible to accomplish.

This alternative has the advantage of not requiring any treatment of stormwater runoff because the water would be diverted away from the Everglades Protection Area (EPA) for other beneficial purposes. Conversely, this alternative also results in the discharge of water to the EPA until 2013 that very likely will not meet water quality standards.

Alternative 2

Alternative 2 includes implementation of basin-scale source controls, as in Alternative 1, and continued discharge to the EPA. Chemical treatment would be used to reduce phosphorus (P) concentrations in the stormwater runoff to levels that meet water quality standards prior to it being pumped into the Refuge. In 2000/2001, HSA Environmental Engineers, Inc. (HSA) completed a pilot scale investigation of chemical treatment of stormwater runoff from ACME Basin B. That investigation showed that it is possible to reduce the P concentration in runoff from Basin B to 10 ppb or less using conventional chemical addition, flocculation, settling, and filtration processes. Additionally, none of the treated effluent streams showed any toxicity effects and none of the residual sidestreams (sludges, etc.) were found to be hazardous. This work demonstrates that, based upon the research completed to date, chemical treatment of stormwater runoff from ACME Basin B to meet water quality standards is technically feasible.

As proposed, Alternative 2 would include construction of a multi-purpose reservoir in Section 24, west of Basin B, for flood control, water supply and water quality treatment. Water from the reservoir would be treated in a chemical treatment facility, assumed to be similar in process configuration to that developed by HSA for the pilot scale investigations. The multi-purpose reservoir in Section 24 would serve to equalize flow through the treatment facility. Chemically treated water would be discharged into a linear, shallow retention area to be constructed between the existing C-27 canal and L-40 levee, before being pumped into the Refuge through existing Pump #1, Pump #2 or both. This results in highly treated water, but water that has a limited amount of natural "conditioning" prior to being discharged into the EPA. Since the chemical treatment process can achieve less than 10 ppb of total phosphorus, untreated stormwater could be blended with the treated effluent to achieve a 10 ppb effluent, thus producing a combined effluent of treated and naturally conditioned waters.

An alternate approach might be to construct the project with the reservoir in Section 24 being used only for flood control and water supply purposes, thereby maximizing its value for flow equalization upstream of the chemical treatment facility. After

chemical treatment, the water would flow though the linear retention area as before, but would then pass through a wetland system before being discharged into the Refuge. The size and type of wetland system to be used for effluent conditioning would need to be determined as part of the alternatives evaluation. Some insight in this regard may be gained from recent data from research in North Test Cell 14 which suggests that the increase in effluent P concentration from a conditioning wetland system such as SAV and PSTA may be reduced significantly after only several months. This alternate approach would involve additional infrastructure and additional cost, but could result in very high quality water which includes a natural buffering system between the chemical treatment facility and the EPA.

Alternative 3

Alternative 3 was identified in the January 7, 2002 District workshop. In this alternative, a stormwater treatment area (STA) would be constructed in Section 24 instead of the multi-purpose reservoir proposed in Alternative 2. The STA would be designed and operated to obtain maximum treatment with flood control and water supply being secondary objectives. Water discharged from the STA would flow through a linear retention area between the C-27 canal and the L-40 before being pumped into the Refuge using existing Pump #1, Pump #2, or both.

As part of our review of this alternative, Brown and Caldwell team members ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from ACME Basin B. The following assumptions were made in performing the DMSTA model runs:

1. A land area of 410 acres was assumed to be available for an STA (Section 24).

2. The flow-weighted mean inflow P concentration to the STA is 94 ppb.

3. A composite STA, consisting of 40 percent emergent macrophytes followed by 60 percent submerged aquatic vegetation (SAV), was assumed for the analysis. This composition of wetland vegetation was discussed and verbally accepted for preliminary evaluation purposes by District staff at the STA Design Group Meeting on January 8, 2002. This preliminary composition will be reassessed during the alternatives evaluation once the final calibration of the DMSTA model is available.

4. The model parameters used to simulate emergent vegetation cells and SAV cells are those from ENR Cell 2 and ENR Cell 4, respectively. These model parameters are taken from a draft version of DMSTA dated January 23, 2001. A final version of DMSTA is expected to be available for use in the Basin Specific Feasibility Studies in February 2002.

5. Source controls (BMPs, ordinances, etc.) were assumed to reduce the flow-weighted mean inflow P concentration to the STA by 0%, 10%, 20%, 30%, 40% and 50%.

Table 1 presents the results of the preliminary DMSTA simulations for Alternative 3. Using a 410-acre STA, and the other assumptions as identified above, it is possible to reduce flow weighted mean P concentrations from 94 ppb to 32 ppb without source controls and to 21 ppb if 50% of the P load is removed by source controls prior to treatment. This equates to geometric means of 20 ppb and 14 ppb, respectively.

TABLE 1

DMSTA Predictions for Various Levels of Source Reduction for the ACME B Basin

STA Area (ac)	Inflow Reduction (%)	Flow-Weighted P Inflow (ppb)	Flow-weighted P Outflow (ppb)	Geometric Mean P Outflow (ppb)
410	0	94.2	31.9	20.3
410	10	84.6	29.8	19.1
410	20	75.2	27.6	17.9
410	30	65.8	25.4	16.7
410	40	56.4	23.2	15.4
410	50	47.0	20.9	14.2

Notes:
Based on 3 cells in series with 40% Emergent / 60% SAV
Tanks-in-Series: Emergent - 3 TIS, SAV - 3 TIS
Calibration Data: EMA - ENR Cell 2, SAV - ENR Cell 4
ACME B Mean flow 31,500 ac-ft/yr

As an additional preliminary analysis, BC used the DMSTA model to evaluate the amount of land required for a STA with 50% source control to reach a flow weighted mean outflow P concentration of 15 ppb. We chose this P concentration as a target because (1) it generally equates to a geometric mean outflow concentration of 10 ppb, the planning level target for the Basin Specific Feasibility Studies, and (2) it generally represents the lower limit of P concentration currently achievable with biological technologies. Ongoing research sponsored by the SFWMD is anticipated to provide further data regarding the P concentration limits that can ultimately be achieved using biological technologies. However, based on this preliminary analysis, it is estimated that approximately 1200 acres of STA will be required to achieve a flow weighted mean outflow P concentration of 15 ppb (10 ppb geometric mean) if 50% of the P is removed through source controls beforehand. This analysis will be updated and refined during the actual Task 4 alternatives evaluation using the final version of the DMSTA model that will be available in February 2002.

Summary

In our opinion, the alternatives proposed for ACME Basin B are reasonable in concept and should all be evaluated as part of the Basin Specific Feasibility Studies. We have suggested a possible alternate concept for the District to consider as part of Alternative 2. All of the alternatives will require additional work to define their components in sufficient detail to support engineering evaluation.

We hope these comments will be of benefit to the District in finalizing the alternatives to be evaluated by the Brown and Caldwell team in the Basin Specific Feasibility Studies. We will be glad to meet with you and other District Staff at your convenience to discuss them. In the meantime, if you have any questions, please do not hesitate to contact me.

Sincerely,

BROWN AND CALDWELL

James A. Nissen, P.E., DEE
Senior Project Manager

JAN:mgp

Cc: Angela Berry, Brown and Caldwell
Arsenio Milian, Milian Swain & Associates, Inc.
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Tom DeBusk, DB Environmental, Inc.
Bob Knight, Wetland Solutions, Inc.

BROWN AND CALDWELL

Appendix B - South Florida Water Management District Responses to Brown and Caldwell Peer Review Comments

ECP 21 BFS-2

December 21, 2001

Mr. James A. Nissen, P.E., DEE
Senior Project Manager
Brown and Caldwell
1060 Maitland Center Commons, Suite 402
Maitland, FL 32751

Dear Mr. Nissen:

The District has reviewed Brown and Caldwell's Peer Review of Preliminary Alternatives for the C-11 West, NNRC, NSID, L-28 and Feeder Canal Basins. Following are the District's responses to the peer review comments.

C-11 West Basin

1. B&C Comment:

It is not clear what type of chemical treatment facility is being proposed in Alternative 1. The CTSS technology developed in the STSOC process employs flow equalization to reduce the size of the CTSS process units required. From the description of the chemical treatment component of this alternative, it does not sound like flow equalization is envisioned. This would tend to drive up the cost of the chemical treatment facility. We suggest clarification on this point or rewording of the description of the chemical treatment component in this alternative.

District Response:

Flow equalization is envisioned for the CTSS facility in this alternative. We will clarify the text accordingly.

2. B&C Comment:

In Alternative 2, the STA component is described as "…consisting generally of 25% emergent vegetation, 50% submerged aquatic vegetation (SAV) and 25% periphyton STA (PSTA)". Is there any data to support the applicability of this combination of biological treatment technologies for this basin? Given the low inflow P concentration in stormwater runoff from the C-11 West Basin (22 ppb), we question that an STA cell dominated by emergent vegetation would provide effective treatment. We believe an aquatic system dominated by SAV and/or periphyton would be more likely to reduce P concentrations.

District Response:

Is it the best professional judgement of the Brown and Caldwell team that there should be no emergent vegetation in the front end of a biological treatment system for this basin? The 25/50/25 concept was a generalized concept to be used as a starting point, and it was not the intent to force all systems to have this exact vegetation composition. The alternatives document will be clarified by adding the following text:

"Optimal Combination of Biological Technologies. Several alternatives will consist of an optimal combination of biological technologies. There appears to be a general understanding that an emergent vegetation cell is desirable at the front end of such a system to act as a nutrient "shock absorber". Based on preliminary research results, it also appears that some combination of submerged aquatic vegetation (SAV) and periphyton-based communities would be more effective at reducing phosphorus concentrations than a system containing only emergent vegetation. However, there is not yet any guidance on the optimum partitioning of these three vegetation communities within an STA. For the purpose of discussing preliminary alternatives, a conceptual partitioning of 25%/50%/25% for emergent/SAV/periphyton was assigned. During the actual evaluation of alternatives (Task 4), this partitioning may be revised based on the best professional judgement of the Consultant, in conjunction with District staff."

3. B&C Comment:

As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the C-11 West Basin using the District's proposed 25/50/25 combination of biological treatment technologies. The results of the modeling show that it is possible to achieve a 10 ppb effluent P concentration even though none of the research studies to date have been able to consistently achieve this result. In our mind, this points out how important it is that the District establish a set of rules and procedures for how the DMSTA model is to be used (calibration data sets, etc.) in evaluating biological treatment alternatives in the Basin Specific Feasibility Studies. We believe that when these rules and procedures are established, the DMSTA model will become a valuable tool for determining the most effective combination of biological treatment technologies in each basin as well as for projecting P removal performance and land area requirements.

District Response:

We agree that a consistent set of rules, procedures and appropriate calibration data sets for using the DMSTA model needs to be agreed upon by the parties associated with the Basin Specific Feasibility Studies. This is the intent of the multiple DMSTA workshops, beginning with the recent December 12th meeting, and continuing through the proposed January 9, 2002, meeting (the date is not final yet). As stated on page 4 of the introductory document (*FINAL DRAFT WATER QUALITY IMPROVEMENT STRATEGIES FOR THE EVERGLADES PRELIMINARY ALTERNATIVE COMBINATIONS FOR THE ESP BASINS*), even though it may be possible to achieve a 10 ppb effluent P concentration using the model, it is the intent that the evaluations using DMSTA stay within the calibrated range of the research data.

4. B&C Comment:

It does not seem reasonable to assume that a chemical treatment facility or an STA would continue in operation after June 2036 to treat 1 percent of the stormwater runoff from the C-11 West Basin. The 1 percent of the baseline flow to be treated most likely would not be evenly distributed throughout the year, suggesting that the treatment facilities would be idle for a majority of the time

or would need to be kept in a standby condition. This might be possible with a chemical treatment facility, but not with an STA. Even if it is possible, there is no basis for estimating the cost of maintaining the treatment facilities in a standby mode or for projecting their treatment performance in such an operational mode. We suggest that the District consider eliminating the chemical treatment component of Alternative 1 and the STA component of Alternative 2 after June 2036 and making all three alternatives for the C-11 West Basin the same for the period 2036 through 2055 (source controls and CERP only).

District Response:
For the purpose of evaluating Alternatives 1 and 2 for the C-11 West Basin, a recommendation to downsize (not eliminate) the chemical treatment component of Alternative 1 and the STA component of Alternative 2 after June 2036 seems reasonable, with associated costs/savings associated with this recommendation.

5. B&C Comment:
We believe that, in some cases, significant cost savings may be realized if projects required to meet the water quality goals of the Everglades Forever Act (EFA) are combined with projects designed to meet the water quantity and distribution objectives of CERP. An example is the CERP reservoir proposed for the C-11 West Basin. If an STA was constructed in the short-term (December 2005) in the location where the CERP reservoir is to be constructed in the longer term (2018), and the STA was designed to be compatible with reservoir operation, it is possible that significant cost savings could result. At a minimum, less land would need to be acquired. Some ancillary long-term treatment benefits might also result. Potential cost savings are associated with this approach and we suggest that the District consider a fourth alternative in the C-11 West Basin that would allow these cost savings to be defined.

District Response:
We agree with the recommendation to add a fourth alternative as described above for this basin.

North New River Canal Basin
6. B&C Comment:

We do not have any recommendations for changes to the preliminary alternatives proposed for this basin. We believe that the three alternatives proposed adequately cover the range of water quality solutions available.

District Response:
Pursuant to the letter we received from the City of Sunrise, we are reviewing the potential flood control impacts of the alternative that recommends discontinuing the use of G-123 until the CERP project comes online. However, this alternative is still considered a viable alternative for evaluation.

North Springs Improvement District Basin

7. B&C Comment:

Alternative 1 calls for a chemical treatment facility to be constructed by 2006 and operated for one year until diversion of runoff from this basin can be diverted to the Hillsboro Impoundment in 2007. We do not believe this is a realistic alternative unless there are other potential water quality benefits to be realized from continued operation of the treatment facility. There are other less costly approaches to chemical treatment that could possibly be implemented on a short-term temporary basis (e.g. use of existing rock pits north of the NSID Basin). We would be glad to discuss these approaches with the District if there is any interest. However, we would recommend that the temporary (i.e. one year) chemical treatment alternative be eliminated altogether.

District Response:

We agree with the recommendation to revise Alternative 1 to eliminate chemical treatment and instead have a temporary diversion to the rock pits to the north (using temporary pumps/structures) until the CERP project comes on line in 2007.

8. B&C Comment:

Another potential alternative for this basin would be to combine the diversion options in Alternatives 2 and 3. It may be possible that a temporary diversion for one year could be achieved in conjunction with planned conversion of agricultural land in the NSID Basin to urban land use between now and 2006. This would need to be coordinated with the developer(s) involved, but if it could be implemented, it would likely be much less costly than constructing a chemical treatment facility that would operate for only one year.

District Response:

. We agree as stated in our previous response. The total number of alternatives for this basin would remain at 3 since Alternative 1 would be a temporary diversion until CERP comes on line, and Alternative 2 would be a permanent diversion which would not rely on the CERP project and, in fact, would provide a benefit to the CERP project.

Feeder Canal Basin

9. B&C Comment:

Because of the potentially larger contribution from Best Management Practices (BMPs) in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

District Response:

We agree with this recommendation and will incorporate it into the text. Likewise, this concept should be included during the evaluation phase (Task 4).

10. B&C Comment:
The flow diversion component in Alternative 1 is not detailed in the alternatives document. However, from the presentation at the workshop, it is our understanding that the District's intent for the flow diversion component is to construct stormwater retention areas to equalize peak flows and allow water to sheet flow from the L-28 Interceptor Canal south and west into the Big Cypress National Preserve. In all likelihood this, will require degradation of at least some of the levee on the west side of the L-28 Interceptor Canal. This is the same concept proposed for the Big Cypress/L-28 Interceptor Modifications Project to be constructed as part of the Comprehensive Everglades Restoration Plan (CERP) by June 2015. By constructing this component as part of the improvements needed to meet Everglades Forever Act requirements, the District would be achieving integration with CERP and could potentially realize considerable cost savings as a result. However, showing both the flow diversion component and the CERP component in Alternative 1 is probably redundant. If our understanding of the District's flow diversion component is correct, the only difference between Alternatives 1 and 3 is the timing of the diversion and the source of funding to pay for it.

District Response:
We agree with your observation that the diversion component is virtually the same as the CERP component except for the timing. We will revise this alternative to remove the CERP component and attempt to clarify the diversion component. This alternative will remain to evaluate the possibility of implementing the diversion by 2006.

11. B&C Comment:
The description of the flow diversion component of Alternative 1 states that … *"It is assumed that the diversion of flow to the Big Cypress National Preserve will achieve a 100% reduction in flows to the S-190 and therefore total loads of phosphorus to WC3A."* This assumption would seem to conflict with the concept of converting the S-190 into a pumping station and pushing water into the L-28 Interceptor Canal for diversion into the Big Cypress National Preserve as proposed in the CERP project for this basin. It would also seem to conflict with the information presented by District staff at the December 11 workshop regarding the concept for the flow diversion component of Alternative 1. Some clarification on this issue would be helpful.

District Response:
We will attempt to clarify the diversion component. The intent is to pump water into the L-28 Interceptor, which would be plugged at the eastern end and act as a spreader canal.

12. B&C Comment:
Stakeholders familiar with Big Cypress National Preserve indicated that sheet flow of 100% of the L-28 basin flows into the Preserve may not be possible due to topographic limitations.

District Response:
There are different sloughs in this area that may be able to convey a steady flow from a storage reservoir designed to hold water from storm events. The eastern portion of the BC Preserve sheet flows south and east into WCA 3A while the remainder sheet flows south.

13. B&C Comment:
The STA component of Alternative 2 does not indicate what type of natural treatment technology may be most appropriate for this basin. As part of our review, the Brown and Caldwell team ran the Dynamic Model for Stormwater Treatment Areas (DMSTA) on stormwater runoff from the Feeder Canal Basin using emergent STA, SAV and PSTA treatment technologies. While preliminary, the results of the modeling showed that the SAV technology was able to achieve low effluent P concentrations using less land than either of the other two technologies individually. However, it is likely that the STA component of Alternative 2 will involve some combination of these technologies to realize the maximum P removal with the least amount of land being required. The STA component of Alternative 2 should probably reflect this.

District Response:
As part of Task 4, the Consultants will use DMSTA to estimate the optimum combination of the technologies to realize maximum P removal with the least amount of land being required.

L-28 Basin
14. B&C Comment:
Because of the potentially larger contribution from BMPs in agricultural areas of this basin, it may be more appropriate to consider 10, 20, 30 and 40 percent reductions in P concentrations due to source controls.

District Response:
We agree with this recommendation and will incorporate it into the text. Likewise, this concept should be included during the evaluation phase (Task 4).

15. B&C Comment:
The description of Alternative 1 does not provide any explanation of what flows will be treated by the STA component. Given the Critical Project component related to the Seminole Reservation Water Conservation Plan and the CERP component involving an STA on the Miccosukee Reservation, it is not clear what flows will remain and how those flows can be collected and routed to a STA without extensive infrastructure improvements. While the concept of treating runoff from the L-28 Basin using natural treatment technology is sound, arriving at a plan for its implementation may be difficult and costly. We would propose that the District look into the possibility of integrating the STA component of Alternative 1 with elements of the projects proposed for the Seminole and/or Miccosukee Reservations to simplify the improvements required.

District Response:
We will be gathering and adding information on the storage capacities and general locations of the STAs for use in the evaluation. This information should be adequate to evaluate the STAs.

16. B&C Comment:
The Introduction states that the Miccosukee Water Management Plan (MWMA) will be completed in 2010. In the Alternative summary on page 6 as well as throughout the Alternative detail descriptions, the MWMA is described as being completed in 2015.

District Response:
During our information gathering we have found that several of the completion dates have changed. The documents will be revised to reflect the corrected dates.

Thank you for your peer review comments on the Preliminary Alternatives for the C-11 West, NNRC, NSID, L-28 and Feeder Canal Basins. We anticipate finalizing the alternatives documents over the next two weeks, however, the responses above should be sufficient to allow you to prepare your Task 4 cost estimate. Please call should you have any questions.

Sincerely,

Tracey T. Piccone, P.E.
Senior Environmental Engineer
South Florida Water Management District

ECP 21 BFS-2

January 31, 2002

Mr. James A. Nissen, P.E., DEE
Senior Project Manager
Brown and Caldwell
1060 Maitland Center Commons, Suite 402
Maitland, FL 32751

Dear Mr. Nissen:

The District has reviewed Brown and Caldwell's Peer Review of Preliminary Alternatives for Acme Basin B dated January 17, 2002. Following are the District's comments and responses:

Alternative 1
None

Alternative 2
We agree with your recommendation to use an alternate approach for this alternative. We recommend evaluating Section 24 as a flow equalization basin to achieve the most cost-effective treatment in the CTSS facility while maintaining existing levels of flood control and water supply in the basin.

Alternative 3
The STA should be designed to obtain the most cost-effective treatment while maintaining existing levels of flood control and water supply in the basin. Based on feedback we have received from District land acquisition staff, you should assume the available land in Section 24 is 375 acres, not 410 acres.

Finally, we would appreciate receiving your firm's best professional judgement on the STA vegetation partitioning issue. Discussions to date with various stakeholders, researchers, and consultants have resulted in preliminary estimates of 25 emergt/50 SAV/25 PSTA, and 60 SAV/40 emerg. These estimates are not meant to be strict guidelines since the latter precludes the use of PSTA and this may be inappropriate in some ESP basin alternatives.

Thank you for your peer review comments on the Preliminary Alternatives for Acme Basin B. Please address the District's comments and submit a final Task 3 report covering all 6 ESP basins. Please call should you have any questions.

Sincerely,

Tracey T. Piccone, P.E.
Senior Environmental Engineer
South Florida Water Management District